

**REMARKS****Status of Claims**

Claims 1-20 are pending after entry of this paper. Claims 1-19 have been rejected.

Claims 1, 7-8, 13-15, and 18 have been amended. Claims 20 has been newly added. Support for the amendments to the claims can be found throughout the instant specification and claims as originally filed, for example at page 2, lines 19-27, at page 6, lines 9-19, and at page 9, lines 12-27. No new matter has been added with these amendments.

Reconsideration and withdrawal of the pending rejections in view of the below remarks are respectfully requested. +

**August 22, 2008 Related Case Statement**

Under MPEP §2001.06(b), it is suggested that disclosure be made of related pending applications which may contain or refer to information that is "material to patentability" of the subject patent application. In the spirit of this provision, applicants have identified pending patent applications in a paper captioned "Related Case Submission" filed on August 22, 2008. Applicants wish to point out that most or all of said related patent applications have been subject to examination by the USPTO by several different examiners in several different art units and references have been cited by examiners in at least some of those applications. For the convenience of the

Examiner, applicants attach PTO-892 reference forms (see Appendix) which have been prepared by examiners in those related applications.

#### Response to Objection to the Specification

The disclosure has been objected to. The Examiner specifically notes an informality at page 12, line 23, of the specification. Applicants have amended the specification to correct the informality. Accordingly, applicants respectfully request withdrawal of the objection to the specification.

#### Response to Rejections under 35 U.S.C. §103

Claims 1-10 have been rejected under 35 U.S.C. §103(a) for allegedly being obvious over Beisswenger et al. (US 4,716,856) in view of Lapple et al. (US 3,578,798). Claims 11-13 have been rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Beisswenger in view of Lapple and in further view of Bresser et al. (US 5,560,762). Claims 14-19 have been rejected under 35 U.S.C. §103(a) for allegedly being over Beisswenger in view of Lapple. The Examiner has presented a brief description of each of the cited references, and has gone on to address each claim or set of claims individually. Applicants specifically address the rejections as they pertain to claim 1, claims 11-13, and claim 14.

The Examiner has cited Beisswenger for allegedly disclosing a method of producing solids in which granular coal is heated to a temperature of 400 to 1200°C in a fluidized bed reactor by an oxygen-containing gas comprising introducing from below a

first gas or gas mixture through at least one gas supply tube into a mixing chamber of the fluidized bed reactor (Office Action at pg. 3). The Examiner also contends that Beisswenger further discloses that particle Froude number are used to define the operating conditions. (Id. at 3).

Regarding claim 1, the Examiner specifically contends that “it would have been obvious to one skilled in the art at the time of invention to modify [the] Beisswenger invention and improve the design of the reactor by an arrangement as disclosed by Lapple for an enhanced reaction rate and heat transfer.” (Office Action at pg. 4). The Examiner admits that Beisswenger does not specifically disclose a gas supply tube surrounded by a stationary annular fluidized bed but contends that Lapple discloses an improvement in a fluidized bed reactor where a central tube is provided which leads upwardly through the fluidized bed into the freeboard space above the normal level of the fluidized bed. (Id.). The Examiner further notes that Beisswenger “gives a range of Froude number to define the ‘operating conditions,’” and that “the range should necessarily be applicable in the gas supply tube, stationary annular fluidized bed and in the mixing chamber, as claimed.” (Id.). Applicants respectfully disagree.

The method as recited in claim 1 is described in the specification at page 2, lines 19-27 (emphasis added):

In accordance with the invention, this object is solved by a method as mentioned above, in which a first gas or gas mixture is introduced from below through a gas supply tube (central tube) into a mixing chamber region of the reactor, the central tube being at least partly surrounded by a stationary annular fluidized bed which is fluidized by supplying fluidizing gas, and in which the gas velocities of the first gas or gas mixture as well as of the fluidizing gas for the annular fluidized bed are adjusted such that the Particle-Froude-Numbers in the central tube are between 1 and 100, in

the annular fluidized bed between 0.02 and 2 and in the mixing chamber between 0.3 and 30.

As the Examiner is well aware, the claims must be interpreted in light of the specification (MPEP § 2106). With respect to claim 1, the specification makes clear that the gas velocities of the first gas mixture and of the fluidizing gas in the central tube, annular fluidized bed, and in the mixing chamber must be adjusted to result in particular Particle-Froude-Numbers to ensure effective mass and heat transfer in the mixing chamber and sufficient retention time in the reactor. (Specification pg. 3, lines 24-30). “Due to the sufficient retention time on the one hand and the good mass and heat transfer on the other hand, a good utilization of the thermal energy introduced into the low-temperature carbonization reactor and an excellent product quality is thus obtained.” (Id. at pg. 3, lines 17-20). The object of the invention, to “provide a method for producing low-temperature coke, which can be performed more efficiently and is characterized in particular by a good utilization of energy” (Id. at pg. 2, lines 15-17), “is [thus] solved” by keeping the Particle-Froude-Numbers “in the central tube...between 1 and 100, in the annular fluidized bed between 0.02 and 2 and in the mixing chamber between 0.3 and 3.” (Id. at pg. 2, lines 25-27). By contrast, the only mention of Froude numbers in Beisswenger is one sentence that states: “[w]hen Froude’s number and Archimedes’ number are used to define the operating conditions, the following ranges can be determined...,” and then merely recites the formula for calculating Froude’s number. Beisswenger does not mention any particular Froude number or ranges of numbers in any of the claims nor anywhere else in the specification, including in the exacting details that describe examples of the invention. Consequently, there is no

teaching, suggestion, or motivation in Beisswenger that would lead one of ordinary skill in the art to control the reactor conditions using the particular particle Froude numbers as recited in claim 1.

The Examiner contends that one of ordinary skill in the art would look to particle Froude numbers as allegedly disclosed in Beisswenger because Beisswenger “gives a range of Froude number to define the ‘operating conditions.’” The Examiner thus concludes that “the range should necessarily be applicable in the gas supply tube, stationary annular fluidized bed and in the mixing chamber, as claimed.” (Office Action at 4). This rationale does not support a *prima facie* case of obviousness. Merely because one could control fluidized beds using Froude numbers does not necessarily mean that one of ordinary skill in the art would choose to do so. There must be some teaching, suggestion or motivation, either within Beisswenger itself, or within the art in general, that would lead one of ordinary skill in the art to desire to control the fluidized bed. As discussed above, there is no such discussion in Beisswenger. At best, Beisswenger merely describes the Froude formula. Accordingly, applicants respectfully assert that the rationale for using Beisswenger does not properly support a *prima facie* case of obviousness.

As an additional point of distinction, Beisswenger discloses a traditional circulating bed reactor, not a stationary annular fluidized bed reactor, as recited in claim 1. Thus, although Beisswenger generally discloses that Froude numbers can be used to control operating conditions, the conditions of Beisswenger are circulating fluidized bed conditions. In contrast, claim 1 requires adjusting Froude numbers to particular ranges for a stationary annular fluidized bed reactor. Furthermore, claim 1 recites the

Froude numbers in the gas supply tube, annular fluidized bed, and mixing chamber, sections not present in the reactors of Beisswenger. Additionally, Lapple does not teach the use of Froude numbers at all. Accordingly, one of ordinary skill in the art reading Beisswenger and Lapple would not be motivated to adjust particle Froude numbers in the reactor of Beisswenger to arrive at the invention as claimed in claim 1. Applicants therefore respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 103(a).

With respect to the rejection of claims 11-13 under 35 U.S.C. § 103(a) over Beisswenger in view of Lapple and further in view of Bresser et al., applicants respectfully submit that Bresser does not cure the deficiencies discussed above regarding claim 1. Applicants therefore respectfully request reconsideration and withdrawal of the rejection of claims 11-13 under 35 U.S.C. § 103(a).

With respect to the rejection of claims 14-16 under 35 U.S.C. § 103(a) over Beisswenger in view of Lapple, the Examiner contends that Beisswenger “discloses a plant for producing solids by the method as discussed under claim 1,” while repeating that Beisswenger “does not disclose an annular fluidized bed which surrounds the gas supply system.” (Office Action at 7). The Examiner concludes that “it would have been obvious to one skilled in the art at the time of invention to modify [the] Beisswenger invention and improve the plant design by a central tube arrangement as disclosed by Lapple for an enhanced reaction rate and heat transfer.” (Id.). Applicants

respectfully disagree that the combination of Beisswenger and Lapple results in the invention as recited in claim 14.

Lapple is directed to an annular fluidized bed reactor for the thermal treatment of a granular or particle-form material (col. 1, lines 65-70). The fluidized bed reactor contains an upright centrally positioned tabular sleeve **14** (col. 1, lines 73-75). According to Lapple:

The fluidized bed materials discharged into the tube **14** are entrained by the combustion gases passing upwardly therethrough and are discharged with the gases into the freeboard space **37** in the upper portion of the vessel above the upper end **16** of the tube.

(col. 2, lines 48-53). Lapple is clear that fluidized bed materials are discharged into the tube through passages **36** formed below the upper end **16** of the tube:

In addition, the lower portion of the fluidized bed **33** is provided with a plurality of tangentially arranged passages **36** in the tube **14**, as shown in FIGS. 1 and 2. The passages **36** discharge particle-form materials from the fluidized bed **33** into the tube **14**, spiraling upwardly therethrough.

(col. 2, lines 43-48).

Lapple discloses a reactor in which the solids enter the tube by means of passages **36** below the upper orifice of the tube. In contrast, amended claim 14 requires that the solids are entrained by gas flowing through the supply tube when passing through the upper orifice region of the gas supply tube. As described in the instant specification, the bed heights in the reactor can be adjusted such that the annular fluidized bed extends at least partially beyond the upper orifice end of the central tube, thus allowing the solids to be entrained by the gas stream when passing through the upper orifice region of the gas supply tube (see, e.g., Specification pg. 6, lines 9-19).

Thus, the modification of Beisswenger by Lapple does not result in a fluidized bed reactor whereby the solids are entrained by the gas stream when passing through the upper orifice region of the gas supply tube. Accordingly, applicants respectfully request reconsideration and withdrawal of the rejection of claim 14 under 35 U.S.C. § 103(a).

The foregoing discussion regarding claim 14 analogously applies to new claim 20, which depends from claim 1 and recites that “the gas flowing through the at least one gas supply tube entrains solids from the stationary annular fluidized bed into the mixing chamber when passing through the upper orifice region of the at least one gas supply tube.”

#### Dependent Claims

The applicants have not independently addressed all of the rejections of the dependent claims. The applicants submit that for at least similar reasons as to why claims 1 and 14, from which claims 2-13 and 15-19 (directly or indirectly) depend are believed allowable as discussed *supra*, claims 2-13 and 15-19 are also allowable. The applicants however, reserve the right to address any individual rejections of the dependent claims and present independent bases for allowance for the dependent claims should such be necessary or appropriate.



Thus, applicants respectfully submit that the invention as recited in the claims as presented herein is allowable over the art of record, and respectfully request that the respective rejections be withdrawn.

### **CONCLUSION**

Based on the foregoing amendments and remarks, applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application. Favorable action by the Examiner is earnestly solicited.

**AUTHORIZATION**

The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. **13-4500**, Order No. 4791-4008.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. **13-4500**, Order No. 4791-4008.

Respectfully submitted,

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